CHEMICAL SHEARING EFFECTS ON SECOND-YEAR FLEECES

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Data showing a real difference in the amount of tops and noils obtained from chemically defleeced sheep compared with conventionally shorn sheep were presented by Hourihan et al., (1970). In that study, we stated that some of the advantage might be due to the greater staple length in the chemically defleeced wool. This might not be true however after the first defleecing. The differences in noils could be attributed mainly to the lack of second cuts in the defleeced wool. In this study, 40 western crossbred wethers were randomly divided into two equal groups, one of which was chemically defleeced (T - treated) and the other conventionally shorn (C - control). Investigations were continued with the same 40 sheep to determine whether there was an effect of the chemical treatment on the second year's fleeces, with particular reference to length of staple and amount of noils.

Materials and Methods

All 40 experimental animals were managed as a single group between April 1969 and March 1970. They grazed on pasture from mid-April in 1969 to November 15, 1969, and were then fed alfalfa pellets and alfalfa

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hay in dry lot until March 23, 1970. To obtain additional information on the relationships of tops, noils, staple length and other factors, each of the two groups from 1969 was further divided randomly into treated and control groups in 1970. Therefore, in 1970 there were four groups which were designated TT, TC, CT and CC, depending on which groups they were involved in for the two consecutive years. The treated sheep were given an average oral dose of 22.7 mg/kg body weight of cyclophosphamide 4/ on March 23 and were defleeced on April 1. The wool growth period was nearly the same for all four groups, with the greatest difference being only four days. Each fleece was bagged separately in a moisture-proof bag and taken to the Wool Laboratory for processing and detailed analysis.

Each fleece was weighed in the Laboratory to obtain a grease fleece weight. Fifty locks were pulled at random from the fleece and each of two operators measured the staple length of 25 locks, which were then thrown back in with the fleece. Each fleece was scoured, carded and combed into top by our regular processing procedures. Fineness was determined on the scoured wool, tops, and noils in the Port-Ar airflow instrument with three readings for each sample. Weights of scoured wool, carded wool, tops and noils were obtained on a moisture-free basis. From these weights, the yields and the ratio of top to noil were calculated. Length and variability of fiber length in the tops were determined by the Suter Stapler method (1968), resulting in a mean length and standard deviation for each fleece. The data were evaluated by analysis of

4/ Cyclophosphamide is not yet commercially available, pending approval by the Food and Drug Administration.

variance. Tests of significance for differences between individual means were also made when the treatment-by-set interactions were significant. These tests were the multiple range tests devised by Duncan (1955). In Table 1 where the results of these tests are presented, those means within a row followed by the same letter do not differ significantly from one another. Those means not followed by the same letter do differ significantly from one another.

Results and Discussion

The TT group had the longest staple length (7.94 cm) and the TC group, the shortest (6.79 cm). The top length measurements (Table 1) were longest for the CT group (6.54 cm) and shortest for the CC group (6.13 cm). The differences were not significant. The average of the staple lengths for the treated fleeces was significantly longer (7.84 cm) than the average for the control fleeces (6.98 cm) at the 5 percent level. The averages of the top lengths were not significantly different -- 6.47 cm for the treated and 6.25 cm for the controls. The standard deviations and coefficients of variation for average top length were significantly greater at the 5 percent level for the treated group. The percent under 5.08 cm was highest for the CC group (38.12) and lowest for the TC group (33.40), making a difference of 4.72 percent which was not significant. There was no evidence that the treatment depressed length growth.

The means for the wool weights obtained at each processing stage and the averages for the treated and control sheep are also shown in Table 1. There were significant differences at the 1 percent level for average top weights (2.22 kg for the treated and 1.90 for the controls), at the 5 percent level for card sliver weights and noil weights (2.43 and .177 and 2.15 and .188 respectively), and at the 10 percent level for scored weights (2.61 for treated and 2.35 for controls). There was no evidence that the treatment depressed wool weight.

The yields in percentage and top to noil ratio (Table 1) differed on the average at the 1 percent level. Card sliver as a percent of clean scoured wool was the only treatment-by-set interaction that was significant in the analysis of variance for yield traits. The greatest difference was that between the TT (93.4) and CC (90.4).

Fineness results showed no differences between the averages of the treated and control groups (Table 2). Treatment-by-set interactions were significant at the 5 percent level for the scoured wool and the noils. The top differences were significant at the 10 percent level. Duncan's multiple range test showed no difference among the individual means for the fineness of scoured wool. Possibly this was due to the fact that the treatment-by-set interaction was barely significant at the 5 percent level (F=4.26 with 4.11 required). Some significant differences were found among means for noil fineness which varied from 26.72 m for the CC group to 28.59 m for the TT group.

The amount of top and noil and, therefore, the top to noil ratio is one important criterion in judging the results of processing. The CT group had the highest ratio (13.8/1) and the CC, the lowest (8.7/1). The average of the treated wool was 13.6/1 and the controls, 10.1/1.

These results show that there is an advantage in chemically shearing wool, since the amount of top obtained for the second-year fleeces is greater and the amount of noils smaller than in conventionally shorn wool as was shown in the first-year fleeces. We stated in 1969 that some of the advantage during the first year was possibly due to the greater staple length in the chemically defleeced wool (9.76 cm for T and 8.88 for C). This was confirmed in the present study. These sheep were treated again in 1971 and the fleeces are ready to be processed.

Summary

Twenty western wethers were treated with an average oral dose of 22.7 mg/kg body weight of cyclophosphamide and the chemically shorn wool was compared with that from 20 western wethers used as controls. The individual fleeces were scoured, carded and combed into tops. Top length was longest for the CT group and shortest for the CC group. Top to noil ratio was higher for the treated wool (13.6/1) than for the control wool (10.1/1). Yields were significantly greater for the treated than for the control wool. There were no significant differences between the two treatments for fineness of scoured wool, top or noils. There was no evidence that the treatment depressed either length or weight of wool.

Literature Cited

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TABLE 1. MEAN WEIGHTS, YIELDS AND LENGTHS FROM INDIVIDUAL FLEECES

1969	T[1]	T	C	C	Averages	
1970	T	C[2]	T	C	T	C
No. of sheep	10	10	10	10	20	20
Grease weight (kg)	4.26	4.32	4.63	4.21	4.44	4.27
Scoured weight (kg)	2.47	2.42	2.75	2.29	2.61[3]	2.35
Card sliver weight (kg)	2.31	2.22	2.55	2.08	2.43[4]	2.15
Top weight (kg)	2.11	2.00	2.34	1.81	2.22[5]	1.90
Noil weight (kg)	.181	.216	.173	.160	.177[4]	.188
Yields in Percent						
Clean scoured/grease	58.0	55.9	59.7	54.3	58.8[5]	55.1
Card sliver/clean scoured	93.4[c]	91.7[b]	92.6[bc]	90.4[a]	93.0[5]	91.0
Top/card sliver	91.2	90.0	91.8	87.4	91.5[5]	88.7
Noils/top	8.0	9.2	7.5	12.2	7.7[5]	10.7
Noils/top and noil	7.2	8.6	6.9	10.7	7.0[5]	9.6
Top/noil ration	13.5/1	11.6/1	13.8/1	8.7/1	13.6/1[5]	10.1/1
Length						
Staple length (cm)	7.94	6.79	7.74	7.18	7.84[4]	6.98
Top length (cm)	6.40	6.38	6.54	6.13	6.47	6.25
Standard deviation (cm)	2.68	2.41	2.69	2.48	2.68[4]	2.44
Coefficient of variation (%)	41.99	37.75	40.93	40.35	41.46[4]	39.15
Percent under 5.08 cm	36.82	33.40	36.07	38.12	36.44	35.75

1/ T = treated with cyclophosphamide
2/ C = control with conventional shearing
3/ significant at 10% level
4/ significant at 5% level
5/ significant at 1% level

a,b,c = Those means within a row and within a particular subclass followed by the same letter do not differ significantly from one another. All others differ significantly ($P<.05$).

TABLE 2. MEAN DIAMETERS OF WOOL FROM INDIVIDUAL FLEECES

						Averages	
1969		T	T	C	C		
1970		T	C	T	C	T	C
Scoured wool	(microns)	29.67	29.44	28.41	27.97	29.04	28.71
Top	(microns)	29.83	29.58	28.68	28.23	29.26	28.91
Noil	(microns)	28.59[b/]	27.95[ab/]	26.98[ab/]	26.72[a/]	27.79	27.34

a,b,c = Those means within a row and within a particular subclass followed by the same letter do not differ significantly from one another. All others differ significantly ($P<.05$).